Claims 1, 3, 21 and 35-41 stand rejected. However, it is noted that an explicit basis for the rejection of claims 38 and 40 is not stated in the Office Action.

Claims 1, 3 and 35 were rejected for double patenting. Accordingly, a terminal disclaimer has been submitted herewith, including a provision that any patent granted on the present application will co-terminate with patent no. 6,347,842, as required by 37 CFR 1.321(c). The present application (serial no. 09/287,707) and patent no. 6,347,842 are commonly owned in their entirety by TOYOTA JIDOSHA KABUSHIKI KAISHA, a company of Japan.

Withdrawal of the double-patenting rejection of claims 1, 3 and 35 is respectfully requested in view of the above.

Claims 1, 3, 21, 36, 37 and 41 were rejected under 35 USC 112, second paragraph, as being indefinite. The Examiner appears to allege a contradiction or inconsistency between the last paragraph of claim 1 and the penultimate paragraph of claim 1, in that reduction of pressure in the brake cylinders does not generally occur in normal operation, but generally occurs in ABS or traction control system operation.

However, there is no contradiction. Reduction of pressure in the brake cylinders can occur in normal operation as claimed, by a reduction of an assisting drive force resulting in a reduction of brake operating force. In this regard, it is noted that pending claim 1 recites that a primary drive force is applied to the pressurizing piston on the basis of a brake operating force, but does not state that the brake operating force is not reduced. Rather, the reducing of pressure recited in the last paragraph of claim 1 takes place, specifically, "without reducing said **primary drive force applied to said pressurizing piston**." This primary drive force is to be distinguished from the brake operating force.

Moreover, claim 1 further recites "reducing a pressure of the fluid in said brake cylinder for a given value of said brake operating force". For example, the recited pressure-reducing means of the changing means can reduce the fluid pressure in the brake cylinder for the brake operating force of 8kg during a normal operation of the braking system, from $3kg/cm^2$ to $2.5kg/cm^2$, by reducing the assisting drive force, and without reducing the primary drive force applied to the pressurizing piston.

In consideration of the foregoing explanation, it is respectfully submitted that claim 1, and claims 3, 21, 36, 37 and 41 dependent thereon, are fully compliant with section 112. Withdrawal of the rejection of these claims under section 112 is therefore respectfully requested.

Claims 1, 35-37, 39 and 41 were rejected under 35 USC 102(b) as being anticipated by Lohberg (US patent no. 4,828,332). Anticipation requires the disclosure, in a prior art reference, of each and every limitation as set forth in the claims. *Titanium Metals Corp. v. Banner*, 227 USPQ 773 (Fed. Cir. 1985). There must be no difference between the claimed invention and reference disclosure for an anticipation rejection under 35 U.S.C. § 102. *Scripps Clinic and Research Foundation v. Genentech, Inc.*, 18 USPQ2d 1001 (Fed. Cir. 1991). In view of the foregoing authority, the cited reference fails to support the asserted rejection.

Among other features of the claimed invention, Lohberg fails to teach, at least, changing means as recited in claim 1. More specifically, Lohberg does not teach reducing a pressure of the fluid in a brake cylinder **without reducing a primary drive force** applied to a pressurizing piston, as required by claim 1. This advantage of the claimed invention over the system described in Lohberg will become more clear in light of the following discussion.

Lohberg relates to electrically controlling a control element 3 to generate an assisting or auxiliary drive force according to an output signal of a sensing device 19 that measures pedal travel. Under some circumstances, a counteracting motor 4 may generate a force opposed to a force applied to the pedal; however, in a normal operation, counteracting motor 4 permits almost unhindered displacement of its push rod 27, and consequently of hinge point 24 (Lohberg, col. 3, lines 47-57; Fig. 1). In such a normal braking operation, the braking force (i.e., the axial force acting on rod 26, which corresponds to brake cylinder pressure) is the sum of a primary drive force (which is equal to the brake operating force when the counteracting motor 4 permits unhindered displacement of hinge point 24) and the assisting drive force. The assisting drive force is equal to the primary drive force (Lohberg, col. 3, lines 58-64).

Fig. A, below, illustrates an example of a normal braking operation according to Lohberg. Fig. A refers to the following parameters:

$f_{op}$: Brake operating force

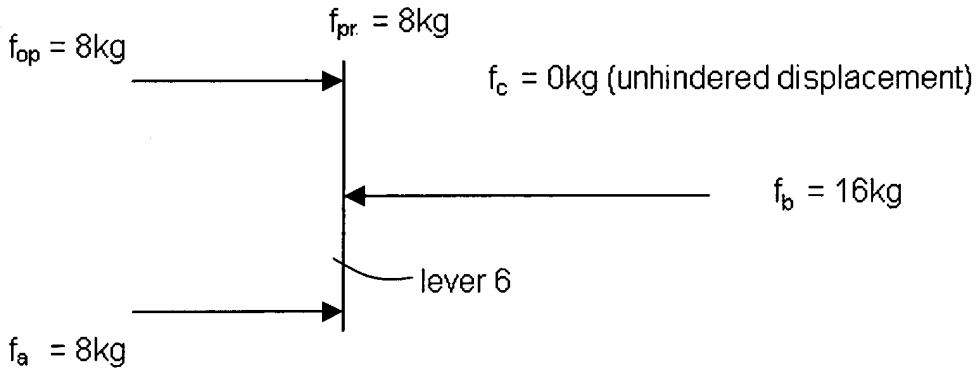
$f_{pr}$: Primary drive force = $f_{op} - f_c$

$f_c$: Counteracting force (generated by counteracting motor 4 in Lohberg)

$f_a$: Assisting drive force or auxiliary drive force generated by control element 3 in Lohberg

$f_b$: Reaction force of braking force (= $f_{pr} + f_a$)

Fig. A (normal braking operation)



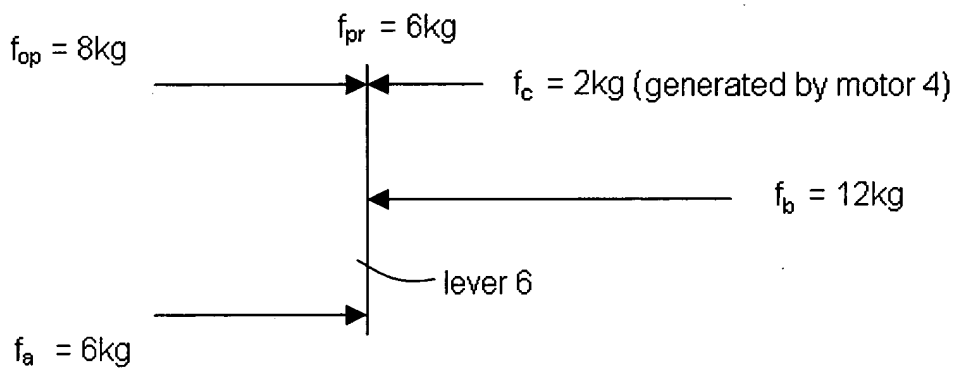

As can be seen in Fig. A, for a normal braking operation (in which the hinge point 24 is displaced without hindrance or resistance by the counteracting motor 4), the system of Lohberg does not require the counteracting motor 4. Consequently, in a normal braking operation, the primary drive force $f_{pr}$ is equal to the brake operating force $f_{op}$ and is equal to the assisting drive force $f_a$ (since the two arm 6, 6' have the same length).

On the other hand, the counteracting motor 4 may apply a force opposed to the pedal force. The following four figures and accompanying description demonstrate that, in contrast to the present invention, in Lohberg's system the fluid pressure in the brake

cylinder for a given value of the brake operating force, cannot be reduced (by application of counteracting motor 4) without reducing the primary drive force.

Lohberg describes at col. 4, lines 14-19 how a foot-pressure-to-pedal-travel characteristic can be controlled by changing the counteracting force $f_c$ generated by the counteracting motor 4. For example, a non-zero counteracting force $f_c$ may be applied as shown in Fig. B, below:

Fig. B

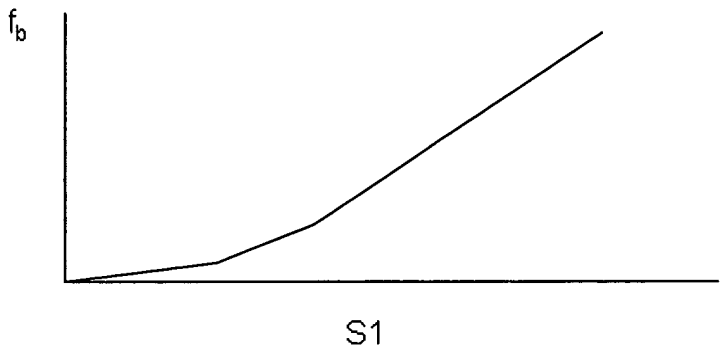



In the case of Fig. B, the pedal travel corresponding to the brake operating force $f_{op}$ of 8kg, and the corresponding primary drive force $f_{pr}$ are reduced by an amount corresponding to the counteracting force $f_c$ generated by the counteracting motor 4. Since the primary drive force $f_{pr}$ is reduced to 6kg, the assisting drive force $f_a$ generated by the control element 3 must be controlled to be 6kg, so that the braking force $f_b$ is equal to 12kg. Thus, the assisting drive force $f_a$ and the braking force $f_b$ are also reduced, with a resulting decrease in the primary drive force $f_{pr}$ from 8kg to 6kg, resulting in a loss or wasting of a portion (2kg) of the brake operating force $f_{op}$ (i.e., a wasting of the operator's effort). Thus, the relationship between the assisting drive force $f_a$ and the brake operating force $f_{op}$ cannot be changed between those of Fig. A and B, without a change in the primary drive force. That is, in contrast to the recitations in the last paragraph of rejected

claim 1, in the system of Lohberg, the fluid pressure in the brake cylinder for a given value of the brake operating force cannot be reduced without reducing the primary drive force.

Additionally, the assisting drive force $f_a$ cannot be changed without changing the counteracting force $f_c$ generated by the counteracting motor 4, as described below. As mentioned above, Lohberg describes at col. 4, lines 14-19 how the foot-pressure-to-pedal-travel characteristic can be changed by controlling the counteracting motor 4. This description is followed by: "Further, by means of the microcomputer 22, it is possible to provide a program-controlled braking-force-to-pedal-travel characteristic to the selected foot-pressure-to-pedal-travel characteristic". This description is interpreted as follows: suppose, for example, that a system as in Lohberg has a braking-force-to-pedal-travel characteristic as shown in Fig. C, below, and let the corresponding pedal travel be called "S1".

Fig. C



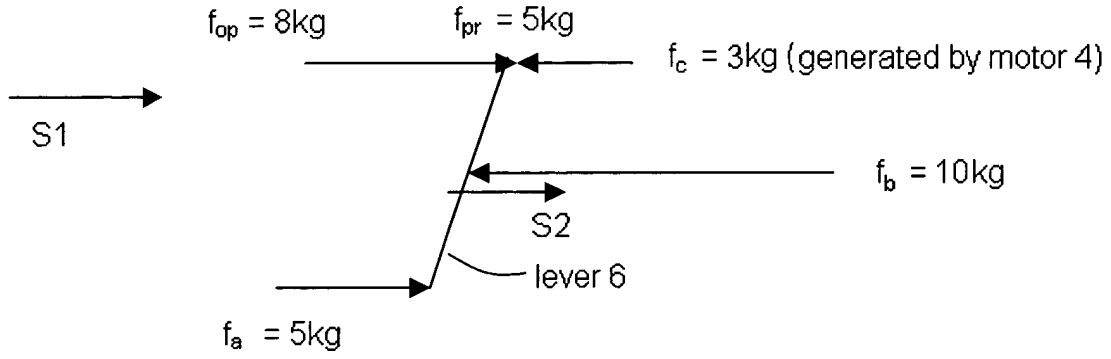

That is, Fig. C shows a corresponding braking force $f_b$ for a given pedal travel S1 (i.e., a degree of deflection of pedal 2 from a resting position). The characteristic curve shown in Fig. C may represent, for example, a predetermined mechanical relationship between the pedal travel S1 and a brake cylinder actuation force by which the brake pads are forced against a rotor to brake a vehicle wheel. Such a mechanical relationship could be determined by various factors associated with the brake cylinder, such as a clearance between the brake pads and the rotor surface, modulus of elasticity

of fluid-transporting rubber hoses, brake pads and caliper, and a degree of compression of the working fluid.

Under typical circumstances, a travel S2 of push rod 26 is equal to S1. However, according to Lohberg as interpreted, the braking-force-to-pedal-travel characteristic as shown in Fig. C may be changed to effect a travel S2 of push rod 26 that is different from pedal travel S1. This may be done, for example, in order that a "pedal feel" corresponding to S1 remains the same to the operator, while actual braking force is reduced or increased (Lohberg, col. 4, lines 18-19). The change may be effected by controlling control element 3.

For example, to establish a desired relationship between the brake force $f_b$ and the pedal stroke S1, irrespective of the predetermined mechanical relationship as illustrated in Fig. C, according to the disclosure in Lohberg, the travel S2 of the push rod 26 may be reduced, by reducing the assisting drive force $f_a$ from the 6kg of Fig. B down to, for example, 5kg, as illustrated in Fig. D below.

Fig. D

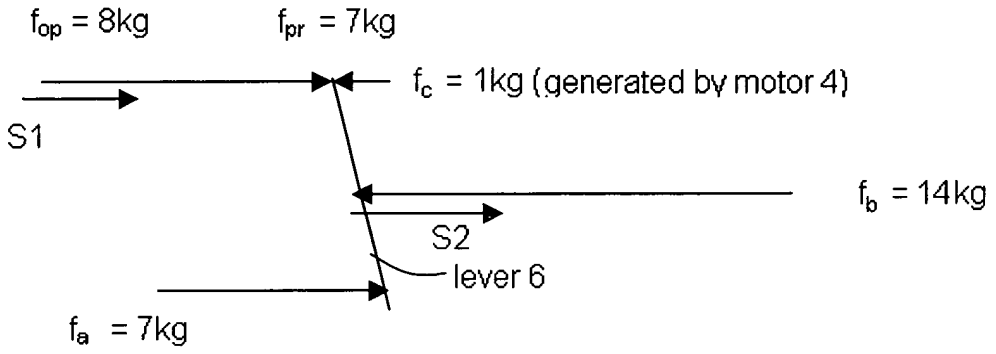



To reduce the travel S2 of the push rod 26 for changing the relationship between the brake cylinder force and the pedal travel S1 irrespective of the mechanically predetermined relationship of Fig. C, while maintaining the relationship between the brake operating force $f_{op}$ and pedal travel S1, the assisting drive force $f_a$ is reduced from 6kg to 5kg, so that the counteracting force $f_c$ to be generated by the counteracting motor must be 3kg. That is, the counteracting force $f_c$ must be increased from 2kg to 3kg, and the

primary drive force $f_{pr}$ must be accordingly reduced from 6kg to 5kg. In this case, therefore, the primary drive force $f_{pr}$ is reduced from the original value of 8kg to 5kg, so that the vehicle operator's effort to operate the brake pedal is considerably wasted.

Other the other hand, the travel S2 of the push rod 26 could be increased while maintaining the relationship between the brake operating force $f_{op}$ and pedal travel S1. However, the primary drive force $f_{pr}$ must be reduced from the original value of 8kg even when the travel S2 of the push rod 26 is increased, as shown in Fig. E, below.

Fig. E




In the case of Fig. E, too, the primary drive force $f_{pr}$ must be reduced, from the original value of 8kg down to 7kg.

It will be understood in view of the foregoing discussion that the counteracting motor 4 is required to change the "braking-force-to-pedal-travel characteristic" as well as to change the "foot-pressure-to-pedal-travel characteristic", in the system of Lohberg. In other words, the counteracting force $f_c$ opposing the brake operating force fop is required for these two purposes in Lohberg. Therefore, the primary drive force $f_{pr}$ must be reduced from the original value of 8kg as shown in Fig. A, to the lower values shown in each of Figs. B, D and E. Thus, the microcomputer 22 does not decrease or increase only the assisting drive force $f_a$, without reducing the primary drive force $f_{pr}$ (i.e., without increasing the counteracting force $f_c$). By contrast, the presently claimed braking system permits

changing the relationship in the normal braking operation between the assisting drive force (brake cylinder pressure), as desired, without reducing the primary drive force, that is, without wasting any portion of the brake operating force or operator's effort. Further, the claimed braking system permits changing the relationship without using a counteracting motor as used in Lohberg. More specifically, Lohberg completely fails to teach the concept defined in the last paragraph of pending claim 1.

It is noted that in paragraph 8 of the above-noted Office Action, the Examiner alleges that the Applicant's argument that the system of Lohberg reduces the primary drive force is incorrect, and that Lohberg counteracts the primary drive force but does not reduce it. The Examiner further alleges that the counteracting force produced by the assisting device 4 is equivalent to the increased resistance felt by the operator when the assisting force is lowered. The Applicant respectfully submits that these allegations are not justified for the reasons set forth above.

Turning now to independent claim 35, Lohberg fails to teach at least the feature recited in the last paragraph thereof. More specifically, Lohberg is silent at least as to "a master cylinder characteristic control device for controlling an amount of the fluid in said pressurizing chamber of said master cylinder, on the basis of said brake operating condition quantity, to thereby control a relationship between a position of said pressurizing piston relative to said cylinder housing and the fluid pressure in said pressurizing chamber, for controlling a fluid pressurizing characteristic of said master cylinder".

This is clear in light of the detailed analysis of Lohberg set forth above. For example, it has been observed that Lohberg discusses controlling a relationship between "foot pressure" (brake operating force of the brake operating member) and "pedal travel" (operating stroke of the brake operating member) and a relationship between "braking force" (fluid pressure in the pressurizing chamber) and the "pedal travel". However, Lohberg is completely silent as to controlling the amount of the fluid in the pressurizing chamber of master cylinder 7 on the basis of the brake operating condition quantity, to control the relationship between the position of the pressurizing piston and the fluid pressure in the pressurizing chamber of the master cylinder 7. By contrast, the present application discloses a master cylinder characteristic control

device, such as the stroke adjusting cylinder 64 illustrated in Fig. 1, which is connected to the master cylinder 12 to achieve the function as recited in the last paragraph of claim 35. The Examiner is respectfully requested to explain how the relationship between the piston position and the fluid pressure in the master cylinder 7 of Lohberg can be controlled in a manner analogous to that achieved by the Applicant's claimed structure.

In consideration of the foregoing, it is respectfully submitted that the asserted rejection for anticipation of independent claims 1 and 35, and consequently of the claims dependent thereon, cannot be sustained. Accordingly, withdrawal of the rejection of claims 1, 35-37, 39 and 41 as anticipated by Lohberg is respectfully requested.

## CONCLUSION

In light of the above discussion, the Applicant respectfully submits that the present application is in all aspects in allowable condition, and earnestly solicits favorable reconsideration and early issuance of a Notice of Allowance.

The Examiner is invited to contact the undersigned at (202) 220-4323 to discuss any matter concerning this application. The Office is authorized to charge any fees under 37 C.F.R. 1.16 or 1.17 related to this communication to Deposit Account No. 11-0600.

Respectfully submitted,

Dated: 10/24/02

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